BTEC Assignment Brief

Qualification	Pearson BTEC International Level 3 Subsidiary Diploma in Applied Science Pearson BTEC International Level 3 Foundation Diploma in Applied Science Pearson BTEC International Level 3 Diploma in Applied Science Pearson BTEC International Level 3 Extended Diploma in Applied Science Pearson BTEC International Level 3 Extended Diploma in Biomedical Science
Unit number and title	**Unit 23: Materials Science**
Learning aim	**C**: Investigate the benefits and limitations of polymer technology.
Assignment title	**Polymers for a purpose**
Assessor	
Issue date	
Hand in deadline	

Vocational Scenario or Context	You are materials science student studying for Pearson BTEC Level 3 National Extended Diploma in Applied Science. The British Plastics Federation is an employer partner of your College and they have invited you to write a briefing paper that it will publish on its website for non-technical members such as finance, logistics and marketing staff to access for professional development. The aim is that the members reading your briefing paper will gain a sufficient understanding of their industry to be more effective in working with their technical colleagues and customers. Your focus will be on case studies of different types of polymers for specific applications, the modification of polymer properties through the addition of additives, and testing the suitability of polymers for specific applications.

Task	Using your lesson notes and research you have carried out polymer chemistry, produce a briefing paper for 'The British Plastics Federation' that includes: • An **explanation** of the uses (e.g. construction, transport, electronics and computing, sport and leisure, packaging, domestic household uses), benefits and limitations of polyvinylchloride (PVC), poly (methyl methacrylate) (PMMA) and Nylon 6,6. Include correct terminology (e.g. natural and synthetic, thermosetting and thermoplastics, polymerisation, monomer, polymer and co-polymer, polymer composites, elasticity and plasticity) to provide appropriate evidence and reasons for their suitability and limitations. • Select at least **THREE** different types of additives (e.g. fillers, plasticisers, cross-linking agents, impact modifiers, antioxidants, stabilisers and decolourants) and **explain** and **justify** the benefits of using these additives with reference to how they modify the properties and molecular

	structure of specific polymers. • Choose **THREE** different polymers from the examples already used to exemplify the benefits of additives and **justify** the methods used to test the suitability of your three examples of modified polymers for a specific purpose. • Choose **THREE** different applications of polymers (such as non-stick coatings, bags, window frames, electrical insulators, fabrics, paint, medicines and automotive parts). **Evaluate** the methods of testing, the uses, benefits, limitations and environmental risks of different types of polymers for each of your chosen applications. You must use evidence to draw valid conclusions.
Checklist of evidence required	A briefing paper which: • Explain the uses, benefits and limitations of polyvinylchloride (PVC), poly (methyl methacrylate) (PMMA) and Nylon 6,6. • An explanation of the benefits of using at least **THREE** different types of additives (e.g. fillers, plasticisers, cross-linking agents, impact modifiers, antioxidants, stabilisers and decolourants) and how they modify the properties of specific polymers; • A justification of the methods used to test the suitability of your three examples of modified polymers for a specific purpose; • An evaluation of the methods of testing, the uses, benefits, limitations and environmental risks of different types of polymers for each of your three chosen applications. Sources of information must be appropriately referenced. Correct scientific terminology must be used.

Criteria covered by this task:	
Unit/Criteria reference	To achieve the criteria, you must show that you are able to:
C. D3	Evaluate the methods of testing, the uses, benefits, limitations and environmental risks of different types of polymers for given applications.
C. M3	Justify the uses of additives and the methods used for testing the suitability of different types of polymers for given applications.
C. P4	Explain the uses, benefits and limitations of polymers.
C. P5	Explain the benefits of using additives to modify the properties of plastics.

Sources of information to support you with this Assignment	http://essentialchemicalindustry.org/polymers/polymers-an-overview.html http://chemed.chem.purdue.edu/genchem/topicreview/bp/1polymer/types.html http://www.chem1.com/acad/webtext/states/polymers.html http://www.bpf.co.uk/plastipedia/additives/Default.aspx Edexcel A Level Science – A2 Chemistry Students Book

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